

## **MODIS Team Meeting Minutes**

### **Minutes of the MODIS Team Meeting held on Tuesday August 23, 1994.**

#### **Action Items:**

91. Clarify the round-robin BRDF measurement requirements. Assigned to Guenther. Due 8/16/94
92. Determine the best way to balance the scan mirror. Assigned to Roberto. 7/19/94. Due 9/ 6/94.
93. Review the Instrument Flight Operations Understanding of 8/26/93. Provide comments by 9/30/94. Assigned to Roberto 8/ 8/94
94. Provide a detailed (high fidelity) analysis of scatter in the scan cavity. The results would determine the need for PF near field scatter measurements vs scan angle. Assigned to Guenther 8/23/94 Preliminary results due 10/15/94. Final due 12/ 6/94
95. SBRC & GSFC to team to investigate possible corrections for the spurious response effects in the filters. Assigned to Waluschka 8/23/94. Due 10/25/94
96. Investigate the potential impact of contamination to near field scatter. Assigned to Waluschka 8/23/94. Due 10/25/94

#### **The following items were distributed:**

- 1) Weekly Status Report #152
- 2) SBRC Memos submission from week #144
- 3) Minutes of the previous team meeting

#### **Attendees:**

✓ Richard Weber	✓ Bruce Guenther	✓ Larissa Graziani
✓ John Bauernschub	✓ George Daelemans	✓ Bob Martineau
✓ Rosemary Vail	✓ Patricia Weir	✓ Bob Silva
Lisa Shears	Mitch Davis	✓ Robert Kiwak
✓ Mike Roberto	✓ Ken Anderson	✓ Harvey Safren
Nelson Ferragut	✓ Rick Sabatino	✓ Ed Knight
✓ Gene Waluschka	✓ Cherie Congedo	Harry Montgomery
✓ Bill Barnes	✓ Jose Florez	Marvin Maxwell
✓ Les Thompson		✓ Bill Mocarsky

### **MODIS Technical Weekly** **August 23, 1994**

#### **Correction**

One micron and two micron Field Programmable Gate Arrays from Actel are under consideration for MODIS.

### **Cherie Congedo-**

- 1) The mainframe survived the vibration tests in Florida!
- 2) Specified fundamental frequency for MODIS and kinematic mounts is 35 Hz.
- 3) When the MEM frame was removed from the mainframe, there were impressions from the screws in the mounting holes.
- 4) The pseudo-kinematic mounts for the optical bench assembly were disassembled after the test and looked good.
- 5) The epoxy bonds between the beryllium plates contributed to more damping than expected.

### **Ken Anderson-**

SBRC schedule control is of concern. Ken Anderson checked into the status of 34 milestone events listed in the June schedule submittal. These included milestones related to both the EM and the PFM. Of the 34, 23 had slipped by one to four weeks, although all still are shown with positive slack.

### **George Daelemans-**

- 1) In air testing of electronics boards for hot spots almost complete
- 2) Second thermal balance test point for EM going to hotter temperature should only take 2 more days. George prepared view graphs to present the technical case for the second thermal balance point to the project.
- 3) NSI has done preliminary estimate of cost of making thermal blankets for MODIS. NSI person may be at SBRC during time of QMR in September to get better idea of required number and sizes of blankets.

### **Ed Knight-**

Ed has updated an unofficial memo of the status of the filters for the 36 MODIS bands. His work is documented in a telemail message dated August 22:

Clearly in spec 3,4,10,12,1,2,16,17,18,27, and 28. Marginal 11, 14, and 15. Clearly out of spec: 8,9,13,19,29, and 30 No data: 5, 6, 7, 20, 21, 22, 23, 24, 25, 26, 31, 32, 33, 34, 35, 36

For the ground system requirements, some SBRC help would be helpful.

Ed reported the following from the systems telecon:

- 1) For the LWIR alignment, the tooling is too coarse. The job will be done manually.
- 2) SBRC has the Plessey rev I chips
- 3) SBRC is testing with the IAC for spurious response. Crosstalk memos have been prepared.

### **Les Thompson-**

Les mentioned again the idea of having a room at SBRC where he and/or Bob Martineau could review raw detector data.

### **Gene Waluschka-**

- 1) Al Robertson mounted the afocal telescope to the graphite epoxy structure. The magnification is 0.4 % less than expected. The error may be in mirror curvature.
- 2) The aft optics are aligned and in focus.

- 3) To increase the S/N, SBRC is planning on using more bright sources for the Integration and Alignment Collimator (IAC).
- 4) One suggestion by SBRC is to characterize the IAC and then subtract out the scatter due to the IAC from the test data.
- 5) Gene prepared a trip report on the MODIS System Performance Workshop:
  - a) Gene believes that SBRC may need some help from GSFC in their attempts to meet the transient response specification.
  - b) Gene describes the knowledge of the point spread transmittance for every field point as a means of fully characterizing the MODIS optical system. The number of PSTs we would need to determine is more than one but may be less than the number of pixels per focal plane.
  - c) Knowledge of the PSTs may make it possible to make radiometric corrections with post processing. It is not clear to Gene that the current set of experiments involving the IAC will permit us to extract the PST information.

**Bob Martineau-**

- 1) There are still two sets of 100 percent operable PFM S/MWIR arrays from low background measurements. Data has been collected, but needs to be analyzed.
- 2) First LWIR PFM SCA is in test. Six others have been hybridized. The one in test did not turn on. SBRC is troubleshooting the test station.
- 3) PFM PC arrays have been mounted on the motherboard. Backups also mounted on another motherboard.
- 4) The VIS and NIR PFM SCAs are in test. For a couple of bands, the NEI did not meet spec. There was a 500 microvolt noise floor problem.

**Bill Mocarsky-**

There may be three and one half mils of anodize on the flight calibrator.

**Jose Florez-**

- 1) FAM module has been assembled. One channel is working with the CLAM.
- 2) SAM is assembled. However, they are getting another regulator.
- 3) MEM
  - a) Excessive force is needed to put cards into the MEM. Backplane will be strengthened.
  - b) The 1553 interface is working.
  - c) Rev I of the Plessey chip has hung up under some conditions.
  - d) Everything is plugged into the assembly, not all tested yet.
  - e) MMU and processor changes. To correct timing problem, will do some redesign to increase margin.
- 4) Engineering Model
  - a) All boards being tested over temperature in air. The most critical boards are being conformal coated and tested in thermal vacuum.

b) SBRC considering boiler plate procedures for EM testing, and then refining procedures for flight.

**Rick Sabatino-**

- 1) All software modules tested for flight.
- 2) MEM integration with flight software about 60 % complete. Expect completion at QMR.

**Larissa Graziani-**

Tom Wolverton says the steel fixture for Z axis vibration may be able to be used for protoflight vibration testing. It has a NASA number on it. We need to be sure we keep it.

**Gerry Godden-**

Gerry has documented his work on mirror scatter due to surface effects and contamination in a paper called Notes on Contaminated Mirror Scatter, dated August 18, 1994. This was documented in the last weekly. A few of Gerry's comments are repeated here:

- 1) For the midwave and longwave infrared, even very small amounts of particulate contamination overpowers microroughness scatter.
  - a) By Gerry's calculations, a class 10,000 clean room will result in 2174 particles 10 microns in diameter per square cm on a horizontally oriented mirror in 100 days (0.1 times that for a vertical mirror).
  - b) For the LWIR, one 10 micron particle/cm<sup>2</sup> scatters sufficiently to be the limiting source of scatter from a 5 Angstrom RMS surface roughness mirror for angles greater than about 5 degrees from specular. There is also significant scatter at smaller angles.
- 2) Based on work by Spyak and Wolfe, Gerry infers that the SWIR and LWIR aft optics scatter performance is dominated by the 60/40 scratch specification. He believes this may dominate mirror cleanliness and microroughness at all wavelengths.

Gerry's analysis indicates that the specifications for the surface quality and cleanliness of our optics may not be sufficiently stringent. The MODIS Characterization Support Team (MCST) may need to develop an "image based" correction algorithm for most of the MODIS bands.

**MODIS Instrument Ground System Requirements-**

Meetings were held the week of August 26 to define these requirements. Attendees included Claire Wilda, Bruce Guenther, Ed Knight, Rick Sabatino, Jose Florez, and Mike Roberto. A workshop to finalize instrument requirements on the ground system will be held at GSFC on September 7 and 8.

To help MODIS prepare requirements for the ground system, Claire provided an outline of items in a memo dated August 1. This memo provided guidance for the meetings. From these meetings, Ed Knight developed a draft of the MODIS instrument ground system requirements.

Mike Roberto August 26, 1994